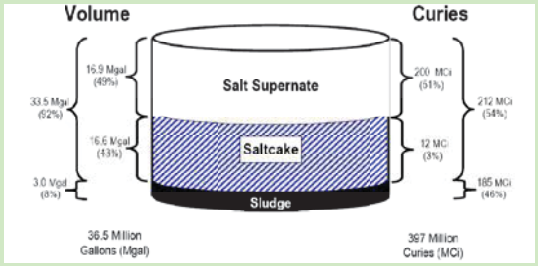
DOE Site:	Savannah River/SRS
EM Project:	Salt Waste Processing Facility/SWPF
TRA Report Date:	July 2009

Technology Readiness Assessment Summary

United States Department of Energy Office of Environmental Management (DOE-EM)

SRS Salt Waste Processing Facility

Why DOE-EM Did This Review



SRS Composite High Level Waste Inventory

DOE Savannah River is constructing a Salt Waste Processing Facility (SWPF) to separate and concentrate targeted radionuclides (Cs-137, Sr-90, and actinides) from High Level Waste (HLW) salt solutions in a series of unit operations. Sr and actinides are removed by contacting the waste solution (after feed adjustment) with a monosodium titanate (MST) solid sorbent in a batch mixer using air pulse agitators. The sorbent (containing Sr and actinides) is removed from solution by cross flow filtration. The filtered solution is passed to a solvent extraction process where Cs is separated to an aqueous (strip solution) effluent stream. The bulk solution (the raffinate) from the extraction process, with targeted nuclides removed to sufficiently low levels, is disposed as Saltstone. The separated high activity streams: the MST adsorbent (with Sr and actinides) and the Cs effluent, are sent for vitrification in the Defense Waste Processing Facility (DWPF). Provisions are in place to perform a second Sr/actinides adsorption step if necessary. The SWPF federal project director requested this assessment to assure that the planned technologies are adequate and have been matured to levels consistent with Critical Decision-3 approval.

What the TRA Team Found

The team identified eight Critical Technology Elements (CTE) of the SWPF which are listed below with a brief description. All CTEs were assigned a Technology Readiness Level of 6.

- Aluminum Chemistry – feed solution adjustments may be required for processing, but could result in undesirable precipitation of Al compounds.
- Air Pulse Agitator – provides a well mixed suspension of MST solids in the salt waste solution.
- Cross Flow Filter – retains the MST sorbent (with Sr and actinides) resulting in a ~5wt% slurry.
- Caustic-Side Solvent Extraction (CSSX) Chemistry – selectively separates Cs from the bulk salt waste solution and produces a Cs-bearing aqueous stream suitable as feed for vitrification and a bulk salt waste (raffinate) suitable as feed for saltstone.
- Centrifugal Contactors – provides continuous extraction of Cs from the bulk salt waste solution.
- Extraction Solvent Recovery – recovers entrained, high-valued organic solvent from the aqueous product streams.
- MST/Sludge Handling – suspends and transports sludge to the melter.
- Process Integration – evaluates how well all subsystems perform with each other and with other on-site facilities.

What the TRA Team Recommended

The team provided the following recommendations:

- Continue study of operating limits to prevent and/or minimize solids formation in feed adjustment and solvent extraction systems.
- An integrated liquid waste systems model should evaluate the impacts on the SWPF and the entire liquid waste system of the Al in sludge being diverted from the DWPF feed to the SWPF feed.
- Interaction and communication between the SWPF project and existing Integrated Salt Disposition Project should continue and be enhanced as much as possible in the future. Exchange of personnel between the projects should be considered.

To view the full TRA reports, please visit this web site:
http://www.em.doe.gov/Pages/ExternalTechReviews.aspx

TRA Summary: August 2011

The objective of a Technology Readiness Assessment (TRA) is to determine the maturity of certain key technologies, identified as Critical Technology Elements (CTEs), using a systematic, metric-based process and to evaluate the readiness of these technologies for insertion into a project design.